Physics

Inertia

- Inertia means an object wants to keep doing what it is already doing

If nothing pushes or pulls it

- still object stay still
- a moving object keeps moving at a same speed in the same direction
- Inertia is tendency to keep the same velocity

Inertial mass tells how hard it is to change the objects velocity

- Can find inertial mass using
- m= F/a
- It is from Newton second law of equal F=ma

Newton's third law

- When two objects touch or interact, they push or Pull each other with equal and opposite forces
- Example when you push a trolley the trolley push is you back with the same force
- When you stop pushing. it stops pushing

But how does anything move if forces are equal

Because the equal forces act on different objects

There are two skaters

- skater a and skater b
- skater a pushes skater b
- A pushes B = Action
- B pushes = Reaction
- Both skaters move apart
- skater a moves more because her mass is smaller
- These equal and opposite forces also explain conservation of momentum

Equilibrium is not Newton's third law

Example

a book on a table

- Book.s weight pulls it down
- tables normal force pushes it up
- these two forces are equal so the book does not move
- but these are not third law pairs because both forces act on the book

The real third law pair are

- Earth pulls book down. book pulls Earth up
- Table pushes book up and book pushes table down

Why it is easier to stop an Empty trolley then a full one

- The full trolley has more mass so it has more momentum
- When there is more Momentum it is harder to stop in the same time

Momentum

- Momentum is something all moving objects have
- momentum= mass x velocity
- Bigger mass or bigger velocity will be equal to bigger momentum
- Momentum has direction so it is a vector quantity

Examples

- 50 kg Cheetah running at 60 km per second so what is the momentum
- 3000kg m/s

Conservation of momentum

- In a closed loop , no external forces,
- total Momentum before = total Momentum after
- Example snooker balls
- White ball moves ,it has a momentum
- Red ball is still and it has zero momentum
- After both move but combined Momentum stays the same

Car crash example

Moving car has a mass of 1500 kg speed is 25 m per second Momentum will be